CLASSIFICATION

CENTRAL INTELLIGENCE AGENCY

INFORMATION REPORT

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BECAUSE OF ILLEGIBILITY OF HEADQUARTERS COPY, FIELD REPORT HAS BEEN MICROFILMED 25X1

The following is a report on the Institute for Electronics and Electron Microscopy, Dresden:[1]

ENCLOSURE ATTACHED PLEASE ROUTE

FEB 28 Read

1. The special feature of the new plant is that the ion source is outside the magnetic field, in contrast to the separator used by Dr. Froehlich. In order to make Froehlich's set as effective as the newly developed installation, it had to be provided with a magnet of 250 tons. The new plant, on the other hand, which was built by VEB Vakutronik, incorporates a magnet weighing only 25 tons. Dr. Froehlich's isotope separator was built in Leningrad after preliminary tests and experiments had been made at Sinop.

2. Several preliminary experiments for the new isotope separator were secretely made by von Ardenne, Jaeger and Lorenz at the Sinop Institute as early as 1954. The hand-written data on the structure of the new separator and the results achieved in these experiments were smuggled from the USSR to Dresden. The definite designs for the new installation were made by chief engineer Jaeger after May 1955.

12 MAR 1958

18 MAR 1958

14 MAR 1958

3. The optimum value to be reached for the separating factor was set at "180 m A".

4. To begin with, iodine and silver were to be used as initial materials.

5. Between 15 November 1955 and 28 August 1956, [redacted] the technical and organizational side of the construction of the isotope separator at VEB Vakutronik, Dresden. Chief engineer Jaeger discussed this work [redacted] 25X1

19 MAR 1958

6. The ion source is a high performance source with a useful effect of 300 m A. It works after the principle of the Penning discharge. The ion source consists of a copper block isolated from the anode. This copper block is also used as an intermediate potential. The copper block had a recess in which the product to be separated is deposited. By heating generator II the temperature of the copper block is raised from 900 to 1,000 degrees C and during this process the product to be

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STATE	X	NAVY	X	NSRB							
ARMY	X	AIR	X	FBI		AEC	X				

separated is vaporized. Generator I heats atungsten band cathode (Band Kathode). The output of this cathode is 10 to 20 volt, - J equal to 200 ampère.

The anode consists of a copper plate which is designed as first collector electrode. The emission opening (Emissionsoeffnung) consists of V IIa-type steel and is rigidly incorporated into the anode plate. Electroden II and III are also of V IIa-type steel.

The emission slit has a height of 220 mm and a width of 12 to 14 mm. Electrode I is connected to + 60 KV and electrode II is put to earth. Electrode III is connected to a voltage of - 10 to 15 KV. Generator III furnishes the arc voltage (Bogenspannung). When fully ignited (durchgezuendeter Betrieb) the arc works under a voltage of about 100 V and 7 or 8 ampères. 170 Ohm inserted in the circuit of the arc serve as compensating resistance. These 170 Ohm are subdivided into two resistances, one having 100 and the other 70 Ohm. When the arc is ignited, the 100-Ohm resistance is fully used. During "Durchzuendung" (?), the 100 Ohm resistance is short-circuited. When the arc is ignited there is a current of up to 1 ampère at the intermediate potential. When the arc is "durchgezuendet" (fully ignited?) the intermediate potential current drops to 100 to 200 m A. The circuit of the intermediate potential is provided with a resistance of 250 Ohm. As the entire ion source is under a high tension potential of + 60 KV, all the generators used were put on isolators. The same applies to all measuring instruments and resistances. The generators are controlled via dry-rectifyers which again are controlled by regulating transformers. As these transformers do not have separate isolating transformers, they are actuated by insulating rods; the same applies to the switching-in knobs used for the motors. The entire electric current required for the system is picked by an insulating transformer, which has a transformation ratio of 380 to 380 V "Wechsel (?)".

The insulation of the transformer is 60 to 70 KV and the transformer has an output of 25 KW.

7. The switching-in of the ion source takes place after the product to be separated has been deposited in the source and the chamber has reached the vacuum desired. The pressure in the source must have a vacuum of 3×10^{-2} Torr when the arc is ignited. When the arc is "durchgezuendet", the pressure is at about $8 \times 5 \times 10^{-3}$ Torr, and the pressure in the chamber is 5×10^{-5} Torr. Then the cathode and generator II used for the heating of the copper block are switched-in. After the vacuum has reached the value desired (3×10^{-2}) the arc generator is activated and slowly excited. The emission takes place at about 250 V. Since this is not enough fully to ignite (durchzuenden?) the arc, a voltage of 450 to 500 V is applied. If the arc is not ignited at this temperature another cathode is used.

8. The high tension installation (70 KV, 300 m A) is switched as a Greetz rectifier. The heating of the valves is controlled via a regulating transformer, the same applies to the anode transformer. A rheostat each was installed in the separate filament current circuits in order to keep the filament current even. Unless the heating of the valves is switched-in, the anode voltage cannot be connected. The filter chain consists of three condensers, each of 0.25 µ V and provided with two throttles, each 100 H y 300 m A. The voltage of the high tension installation is measured through a precision resistance in relation

to earth pressure. As a protection against excess current, an overload relay was inserted; this device breaks the current in the event of excess current. The high tension installation is needed as a suction voltage device for electrods I. A resistance of 10 Kilo-Ohm was installed as a protective resistance. The negative pole of the installation is grounded.

9. The high tension installation of 25 KV (full-wave rectification) is needed for collector electrode III of the isotope separator. For each condenser there is a filter chain 0.02 μ F (3 units) in addition to two throttles each with 10 H y - m A. The installation is protected by an overload relay. As with the 70 KV high tension installation, the anode voltage cannot be connected unless the heating of the valves is switched-in. The voltage of the 25 KV high tension plant is measured as indicated in paragraph 9 above.

10. The iron of the 25-ton magnet consists of Armco substitute, because Armco iron was not available in the GDR. The coils of the magnet [verb missing] together from copper plates, and one coil weighs about one ton. The coils have 60,000 ampère windings and they are excited via a direct current generator which produces a voltage of 250 V ÷ 50 ampère. The generator is separately excited through a valve rectifier. The induction current is measured, and the same applies to the current and the voltage for the coils, which are water-cooled.

The coils are placed around the pole shoes of the magnet, and the deflection chamber is located between the pole shoes. No information was available on the Gauss value of the magnet, because the installation was not yet in operation. A piece of copper tubing 1.5 meters long connected the ion source and the deflection chamber. The ion source is installed in this copper tubing which is placed horizontally and which is connected to an oil diffusion pump of 3,000 liters capacity. Behind the suction chamber, at a point where the beam has already been deflected, there is a second copper tube which has an inclination of about 30° and is also about 1.5 meters long. The end of this tube mounts a collector with two pouches where the separated product is collected and measured. The inner diameter of the two copper tubes is 400 mm. For the measuring of the vacuum, a Philips-type discharge tube was inserted. The rough vacuum (Vorvakuum) was measured with a thermocouple. As forepump a rotating quadruple-oil pump with a capacity of 80 ccm was installed. A second such pump was installed for the production of the initial vacuum in the chamber. The magnet was excited via a regulating transformer; detailed information was, however, not available.

11. [redacted] a magnetic isotope separator was allegedly also under construction at an undetermined institute in Leipzig. [redacted] 25X1

[redacted] 25X1

12. [redacted]

[redacted] comment. Probably the Institute described is the Forschungsinstitut fuer Elektronenphysik, Ionenphysik, und Uebermikroskopie, the so-called Ardenne Institute, Dresden-Weisser Hirsch.

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COUNTRY East Germany

REPORT

25X1

SUBJECT Institute for Electronics and Electron Microscopy, Dresden

DATE OF REPORT 18 December 1957

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LAST REPORT ON SUBJECT
(If applicable)

ANNEXES 4 blueprints

1. The special feature of the new plant is that the ion source is outside the magnetic field in contrast to the separator used by Dr. Froehlich. In order to make Froehlich's set just as effective as the newly developed installation it had to be provided with a magnet of 250 tons. The new plant on the other hand, which was built by VEB Vakutronik, incorporates a magnet weighing only 25 tons. Dr. Froehlich's isotope separator was built in Leningrad after preliminary tests and experiments had been made at Sinop.

2. Several preliminary experiments for the new isotope separator were secretely made by von Ardenne, Jaeger and Lorenz at the Sinop Institute as early as 1954. The hand-written data on the structure of the new separator and the results achieved in these experiments were smuggled from the USSR to Dresden. The definite designs for the new installation were made by chief engineer Jaeger after May 1955.

3. The optimum value to be reached for the separating factor was set a "180 m A".

4. To begin with, iodine and silver were to be used as initial materials.

5. 25X1

6. The ion source is a high performance source with a useful effect of 300 m A. It works after the principle of the Penning discharge. The ion source consists of a copper block isolated from the anode. This copper block is also used as an intermediate potential. The copper block had a recess in which the product to be separated is deposited. By heating generator II the temperature of the copper block is raised from 900 to 1,000 degrees C and during this process the product to be

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separated is vaporized. Generator I heats a Wolfram-band cathode (Band Kathode). The output of this cathode is 10 to 20 volt, - J equal to 200 ampère.

The anode consists of a copper plate which is designed as first collector electrode. The emission opening (Emissionsoeffnung) consists of V IIa-type steel and is rigidly incorporated into the anode plate. Electrodes II and III are also of V IIa-type steel.

The emission slit has a height of 220 mm and a width of 12 to 14 mm. Electrode I is connected to + 60 KV and electrode II is put to earth. Electrode III is connected to a voltage of - 10 to 15 KV. Generator III furnishes the arc voltage (Bogenspannung). When fully ignited (durchgesuendeter Betrieb) the arc works under a voltage of about 100 V and 7 or 8 ampères. 170 Ohm inserted in the circuit of the arc serve as compensating resistance. These 170 Ohm are subdivided into two resistances, one having 100 and the other 70 Ohm. When the arc is ignited, the 100-Ohm resistance is fully used. During "Durchsuendung" (?), the 100 Ohm resistance is short-circuited. When the arc is ignited there is a current of up to 1 ampère at the intermediate potential. When the arc is "durchgesuendet" (fully ignited?) the intermediate potential current drops to 100 to 200 m A. The circuit of the intermediate potential is provided with a resistance of 250 Ohm. As the entire ion source is under a high tension potential of + 60 KV, all the generators used were put on isolators. The same applies to all measuring instruments and resistances. The generators are controlled via dry-rectifyers which again are controlled by regulating transformers. As these transformers do not have separate isolating transformers, they are actuated by insulating rods; the same applies to the switching-in knobs used for the motors. The entire electric current required for the system is picked by an insulating transformer, which has a transformation ratio of 380 to 380 V "Wechsel (?)".

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8. The high tension installation (70 KV, 300 m A) is switched as a Graetz rectifyer. The heating of the valves is controlled via a regulating transformer, the same applies to the anode transformer. A rheostat each was installed in the separate filament current circuits in order to keep the filament current even. Unless the heating of the valves is switched-in, the anode voltage cannot be connected. The filter chain consists of three condensors, each of 0.25 µ V and provided with two throttles, each 100 H y 300 m A. The voltage of the high tension installation is measured through a precision resistance in relation

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to earth pressure. As a protection against excess current an overload relay was inserted and this device breaks the current in the event of excess current. The high tension installation is needed as a suction voltage device for electrode I. A resistance of 10 Kilo-Ohm was installed as a protective resistance. The negative pole of the installation is grounded.

9. The high tension installation of 25 KV (full-wave rectification) is needed for collector electrode III of the isotope separator. For each condensor there is a filter chain 0.02 µ F (3 units) in addition to two throttles each with 10 H y - m A. The installation is protected by an overload relay. As with the 70 KV high tension installation, the anode voltage cannot be connected unless the heating of the valves is switched-in. The voltage of the 25 KV high tension plant is measured as indicated in paragraph 9 above.

10. The iron of the 25-ton magnet consists of Armko substitute, because Armko iron was not available in the GDR. The coiles of the magnet together from copper plates, and one coil weighs about one ton. The coils have 60,000 ampère windings and they are excited via a direct current generator which produces a voltage of 250 V ; 50 ampère. The generator is separately excited through a valve rectifyer. The induction current is measured, and the same applies to the current and the voltage for the coils which are water-cooled.

The coils are placed round the pole shoes of the magnet, and the deflection chamber is located between the pole shoes. No information was available on the Gauss value of the magnet, because the installation was not yet in operation. A piece of copper tubing 1.5 meters long connected the ion source and the deflection chamber. The ion source is installed in this copper tubing which is placed horizontally and which is connected to an oil diffusion pump of 3,000 liters capacity. Behind the suction chamber, at a point where the beam has already been deflected, there is a second copper tube which has an inclination of about 30° and is also about 1.5 meters long. The end of this tube mounts a collector with two pouches where the separated product is collected and measured. The inner diameter of the two copper tubes is 400 mm. For the measuring of the vacuum, a Philips-type discharge tube was inserted. The rough-vacuum (Vorvakuum) was measured with a thermocouple. As forepump a rotating quadruple-oil pump with a capacity of 80 ccm was installed. A second such pump was installed for the production of the initial vacuum in the chamber. The magnet was excited via a regulating transformer; detailed information was, however, not available.

11. [redacted] a magnetic isotope separator was allegedly also under construction at an undetermined institute in Leipzig. 25X1
the magnetic isotope separator was under construction in Dresden. 25X1

[redacted]

[redacted] Comment. For sketches of the isotope separator in Dresden, see annexes 1 through 4.

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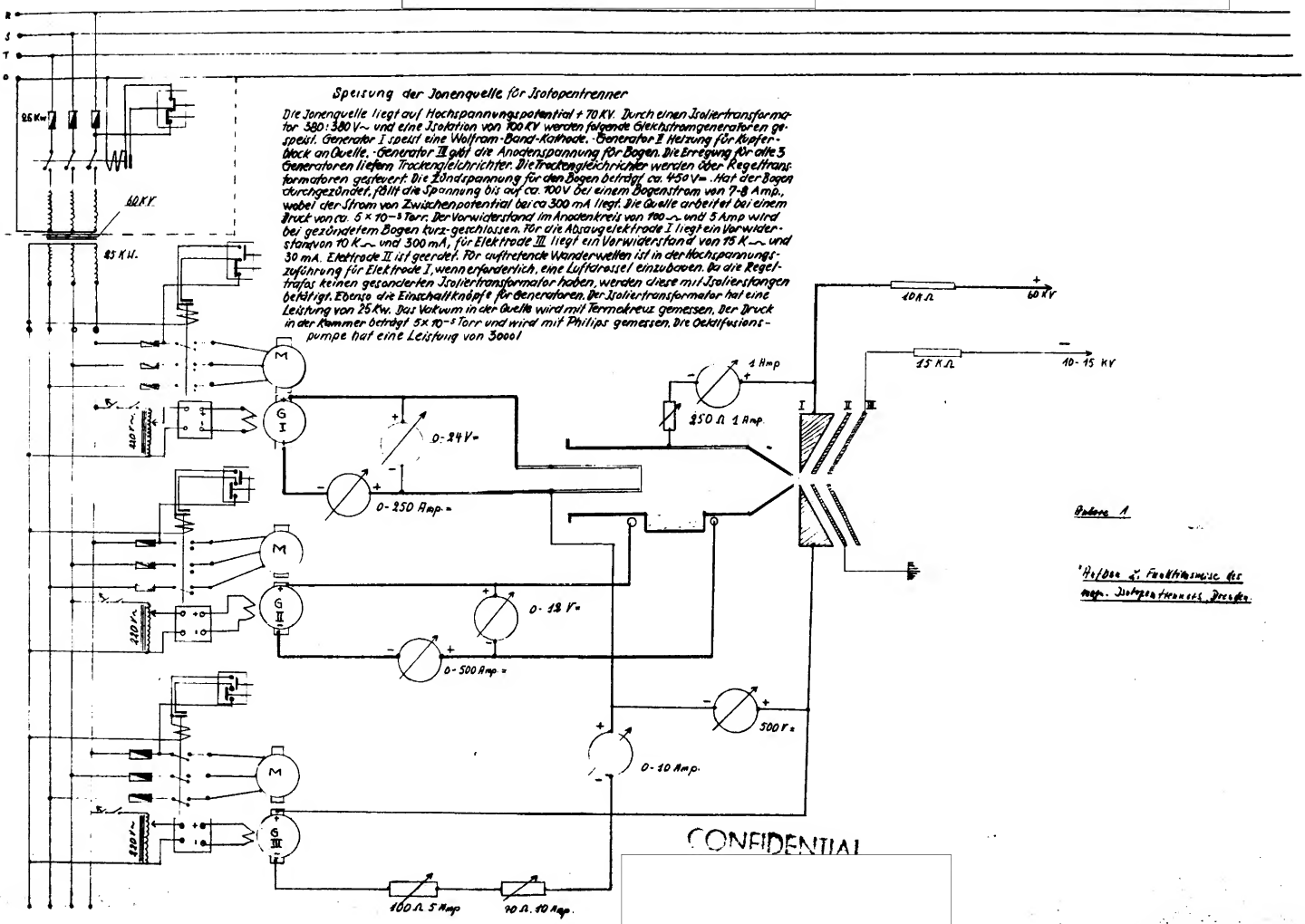

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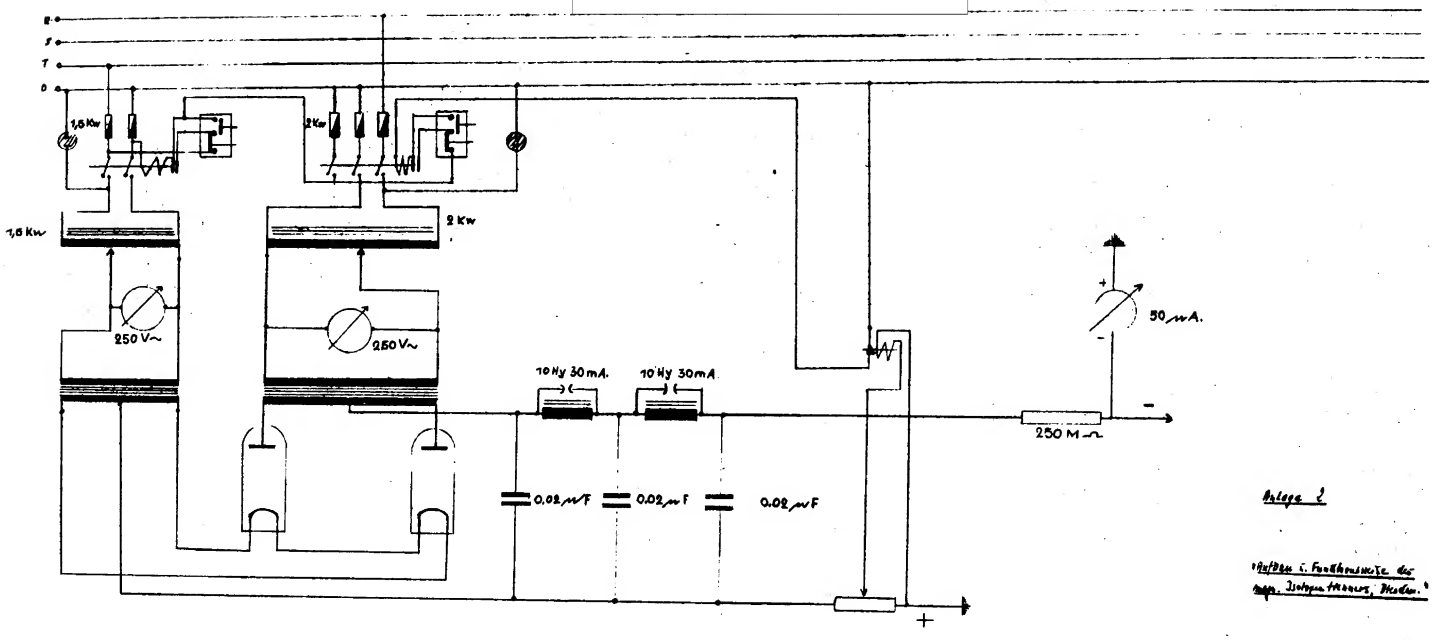

Anlage 2

Aufbau u. Funktionsweise der Hochspannungsanlage, Modell.

Hochspannungsanlage 25 KV

Die Hochspannungsanlage Doppelweg-Gleichrichtung wird benötigt für die Abzugselektrode II des Isotopentrenners. Die Siebkette beträgt je Kondensator 0,02 µF (3 Stück) und 2 Drosseln je 10 Hy - 1mA. Die Anlage ist strommäßig durch Überstromrelais abgesichert. - Zu beachten ist, wenn Heizung der Ventile nicht eingeschaltet ist, kann die Anodenspannung nicht zugeschaltet werden. Die Spannung der Hochspannungsanlage wird über Meßwiderstand-Instrument zur Erde gemessen.

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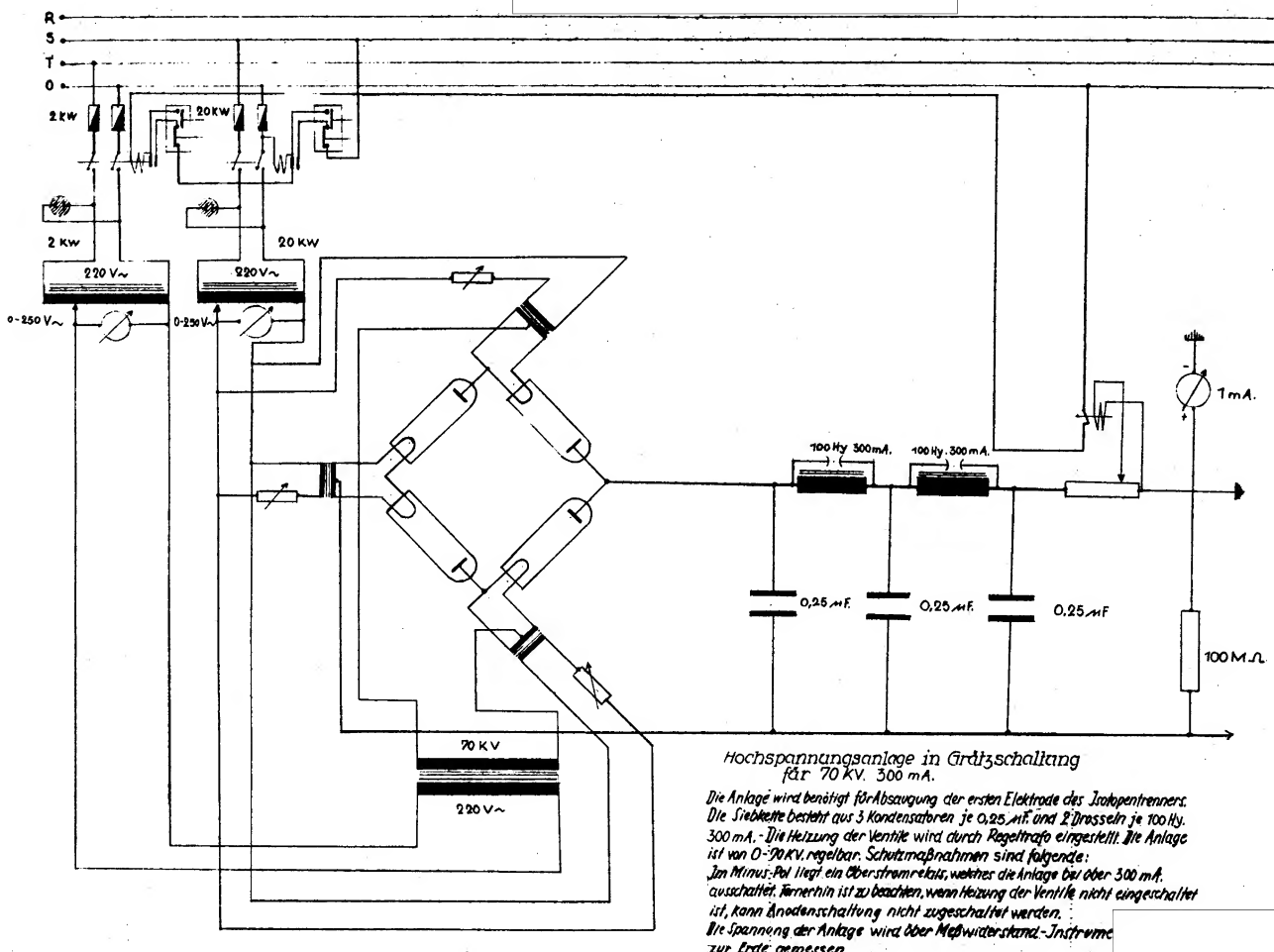

Anlage 3

Hochspannungsanlage in Grätzschaltung
für 70 KV. 300 mA.

Die Anlage wird benötigt für Absaugung der ersten Elektrode des Isotopentrenners. Die Siebkette besteht aus 3 Kondensatoren je 0,25 mF. und 2 Drosseln je 100 Hy. 300 mA. - Die Heizung der Ventile wird durch Regeltrafo eingestellt. Die Anlage ist von 0-70 KV. regelbar. Schutzmaßnahmen sind folgende:
Im Minus-Pol liegt ein Überstromrelais, welches die Anlage bei über 300 mA. ausschaltet. Ferner hin ist zu beachten, wenn Heizung der Ventile nicht eingeschaltet ist, kann Anodenschaltung nicht zugeschaltet werden.
Die Spannung der Anlage wird über Meßwiderstand-Instrume
zur Erde gemessen.

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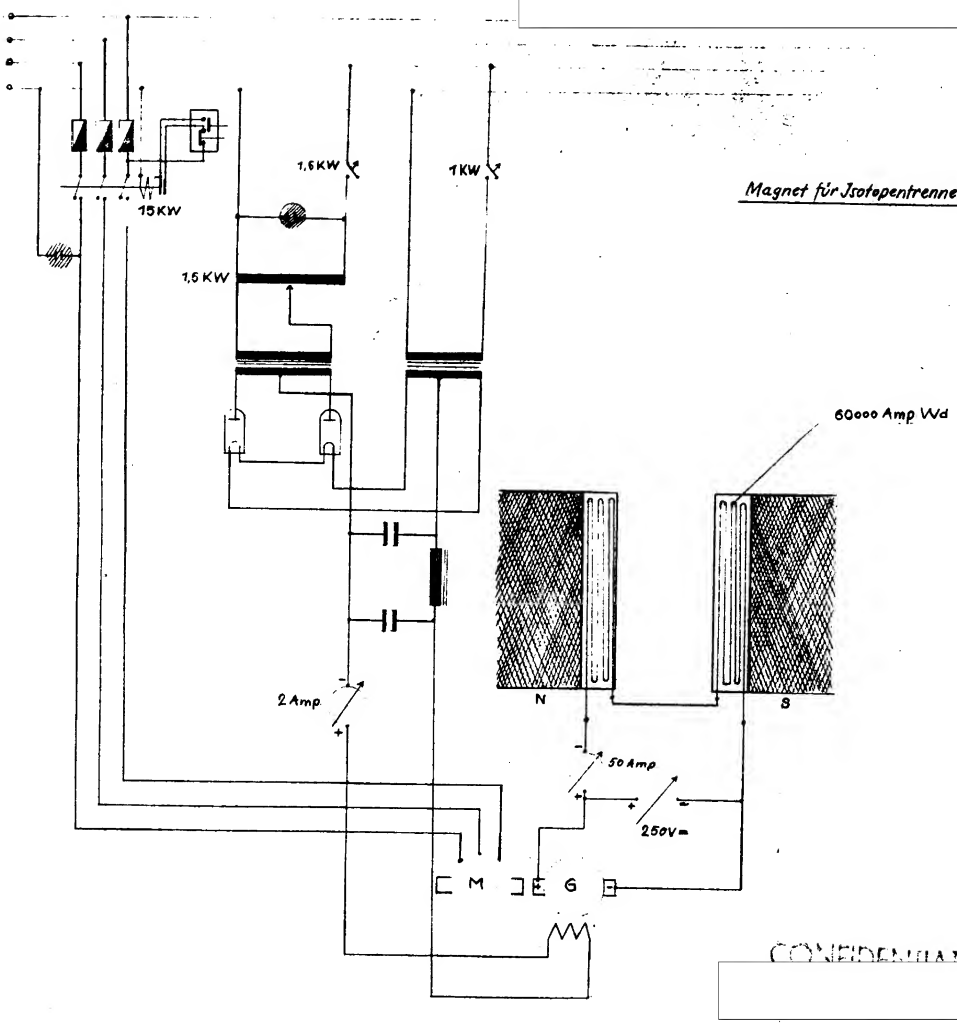

Magnet für Isotopentrenner 25 t.

Anlage 4

Aufbau u. Funktionsweise der magn. Isotopentrennanlage, Prinzip.

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